AMENDMENTS TO THE CLAIMS

Please amend the claims as follows:

1. (Original) A novel photovoltaic solar cell comprising:

at least one absorber layer, and

at least one doped window layer having at least two sub-layers, wherein the first sub-window-layer is adjacent the absorber layer and forms a desirable junction with the absorber-layer and wherein the second sub-window-layer is adjacent the first sub-window-layer and has high optical transmission.

2. (Currently Amended) The solar cell of claim 1, wherein the photovoltaic cell comprises ~~an~~ a thin film silicon (tf-Si) alloy based solar cell including at least one of amorphous silicon (a-Si:H) based solar cell, nanocrystalline silicon (nc-Si:H) based solar cell, microcrystalline silicon (μc-Si:H) based solar, polycrystalline silicon (poly-Si:H) based solar cell, or other combinations and mixtures.

3. (Original) The solar cell of claim 2, wherein the photovoltaic cell including at least one of a-Si:H, a-$Si_{(1-x)}Ge_x$:H and other combinations and mixtures.

4. (Original) The solar cell of claim 2 wherein the doped window-layer comprises a p-type layer or an n-type layer.

5. (Original) The solar cell of claim 2, wherein the doped window-layer is formed using vapor phase deposition.

6. (Original) The solar cell of claim 5, wherein the doped window-layer is formed using plasma enhanced chemical vapor deposition.

7. (Original) The solar cell of claim 5, wherein the desirable deposition conditions are achieved by varying parameters including at least one of the following: temperature, composition of gas mixtures, rf power, pressure, reactor geometry and dilution with gases such as hydrogen.

8. (Original) The solar cell of claim 7, where the sub-window-layer is a p-type layer.

9. (Original) The solar cell of claim 7, wherein the deposition parameter adjusted to achieve desirable semiconductor properties is temperature.

10. (Original) The solar cell of claim 1, having a conversion efficiency of about 10% or greater.

11. (Original) The solar cell of claim 1, further comprising a substrate selected from at least one of: glass, metal or plastic.

12. (Original) The solar cell of claim 11, further comprising a suitable transparent conductive oxide layer adjacent the second sub-window-layer.

13. (Original) The solar cell of claim 1, further comprising an encapsulation layer overlaying the solar cell to provide a substantially airtight and watertight protective barrier against moisture and contaminants.

14. (Original) The solar cell of claim 1, further comprising a buffer semi-conductor layer between the absorber-layer and the first sub-window-layer.

15. (Original) The solar cell of claim 4, wherein the first and second sub-window layers each comprise silicon-containing materials.

16. (Original) The solar cell of claim 15, wherein the absorber-layer comprises hydrogenated amorphous silicon germanium.

17. (Original) A method for manufacturing a solar cell comprising the steps of

(i) providing a substrate;

(ii) depositing semiconductor layers that comprise at least one absorber layer and at least one doped-window-layer, wherein the doped window layer comprises at least two-sub-window-layers deposited under desirable deposition conditions; and,

(iii) depositing a layer of transparent conducting oxide next to the doped-window-layer but not in direct contact with the absorber layer.

18. (Original) The method of claim 17, in which the first sub-window-layer is adjacent to the absorber layer and is deposited under conditions which achieve a desirable junction with the absorber layer; and in which the second sub-window-layer is adjacent the first sub-window-layer but not directly in contact with the absorber-layer and is deposited under conditions which achieve high optical transmission.

19. (Original) The method of claim 18, further including depositing the doped window layer before deposition of the semiconductor absorber layer.

20. (Original) The method of claim 18, further including depositing the doped window layer after deposition of the semiconductor absorber layer.

21. (Original) The method of claim 18, wherein the absorber layer contains silicon and germanium and during the absorber layer deposition an optimized ratio of germane-containing gas and silicon-containing gas provides a Ge content suitable for forming a high efficiency single-junction solar cell.

22. (Original) The method of claim 18, wherein the first and second sub-window-layers are deposited by a vapor phase deposition process.

23. (Original) The method of claim 22, wherein the vapor phase deposition process comprises plasma enhanced chemical vapor deposition.

24. (Original) The method of claim 23, in which the plasma enhanced chemical vapor deposition comprises radio frequency plasma enhanced chemical vapor deposition.

25. (Original) The method of claim 24, wherein the first and second window-layers silicon-containing material are selected from the group consisting of a-Si:H, a-$Si_{1-x}C_x$:H, a-$Si_{1-x}Ge_x$:H, nc-Si:H, nc-$Si_{1-x}C_x$:H, nc-$Si_{1-x}Ge_x$:H, μc-Si:H, μc-$Si_{1-x}C_x$:H, μc-$Si_{1-x}Ge_x$:H,as well as the mixture and combination of the above

26. (Original) The method of claim 25, wherein the plasma enhanced chemical vapor deposition is by at least one of the following: cathodic direct current glow discharge, anodic direct current glow discharge, radio frequency glow discharge, very high frequency (VHF) glow discharge, alternate current glow discharge, or microwave glow discharge.

27. (Original) The solar cell of claim 8, wherein the first sub-p-layer is deposited at about 140°C.

28. (Original) The solar cell of claim 8, wherein the second sub-p-layer has a transparency greater than the transparency of the first sub-p-layer.

29. (Original) The solar cell of claim 28, wherein the second sub-p-layer is deposited at a temperature sufficient low to provide acceptable transparency.

30. (Original) The solar cell of claim 29, wherein the second sub-p-layer is deposited at or below a temperature of about 70°C.

31. - 69. Cancelled

70. (Original) The solar cell of claim 3, wherein the photovoltaic cell uses intrinsic semiconductor materials a-$Si_{(1-x)}Ge_x$:H with minimal light-induced degradation and appropriate bandgap to achieve high conversion efficiency for single-junction solar cells.

71. (Original) The solar cell of claim 70, wherein x is around 0.1 to 0.3 for high-efficiency single-junction solar cell.

72. (Original) The solar cell of claim 4, wherein the doped window layer is deposited under conditions that continuously changed from that of first sub-window-layer to that of the second sub-window-layer.

73. (Original) The solar cell of claim 4, wherein heavily doped interface layer, with doping level greater than the bulk of the n-layer, is used between the n-layer the a TCO layer.

74. (Original) The solar cell of claim 4, wherein a heavily doped p-type interface layer, with a doping level greater than the bulk of p-type doped layer, is used between the p-layer and the TCO layer.